Remote sensing of irrigated areas, crop types, and their productivity in the MENA region

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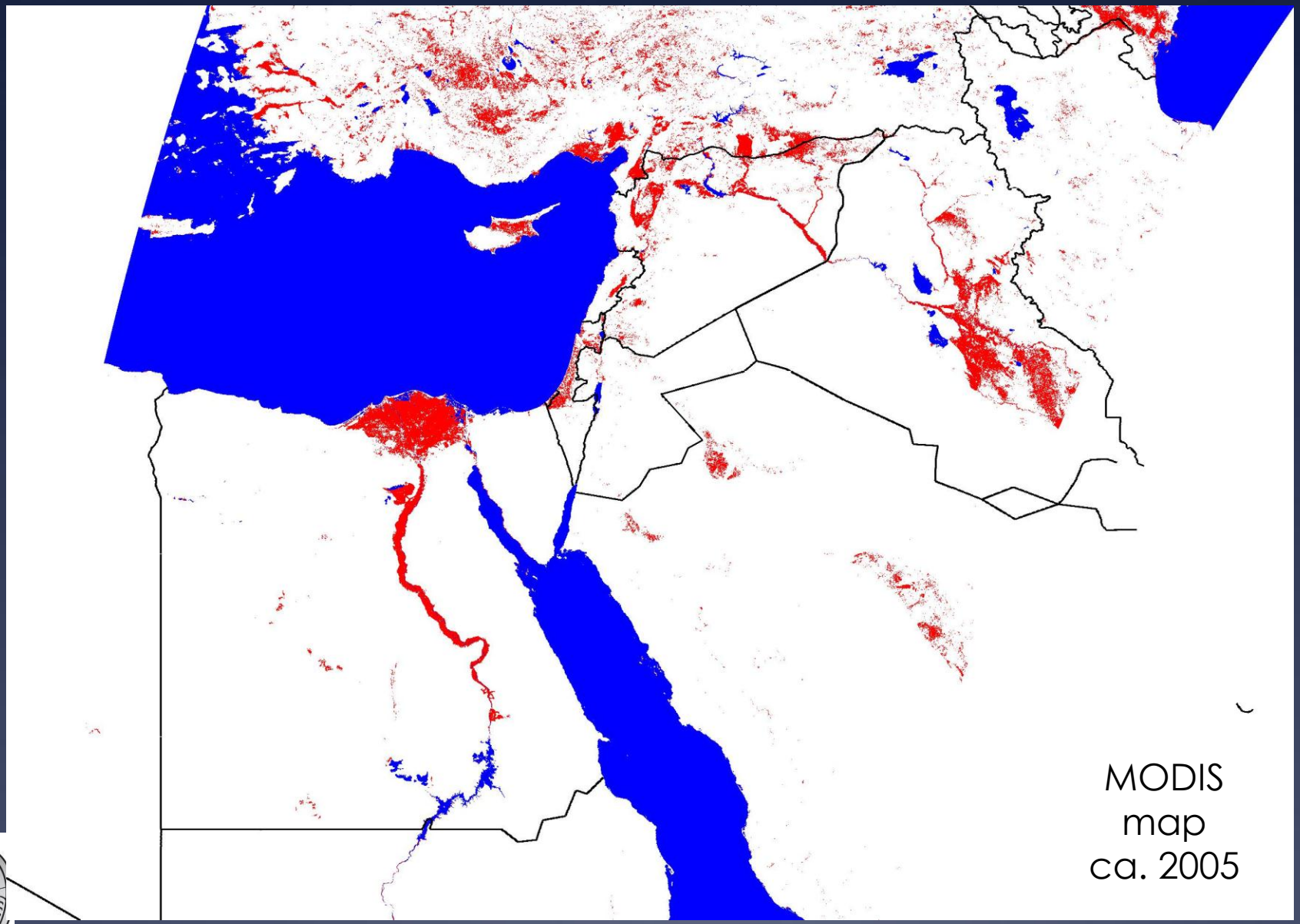
Activities

- Irrigation mapping
  - MODIS based preliminary map completed delivered to NASA
  - Mostly accurate with majority of errors being "Errors of Commission"
  - Need to improve spatial resolution in MENA countries
- Crop type mapping
  - Map major crop types on an annual basis
  - Developing a methodology to merge data from different sensors to maximize strengths
- Yield assessment
  - Use crop modeling to estimate yield (RS backend)
  - Use RS directly via LUE model
- Climate change
  - What are the scenarios, models, variables, accuracy?
  - Once downscaled, answer sector specific questions..

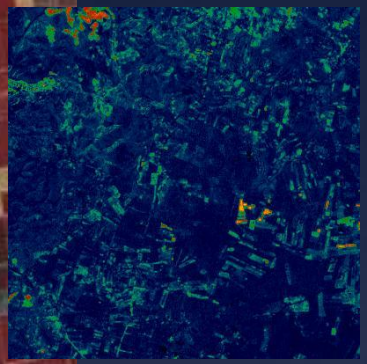
MENA irrigated areas

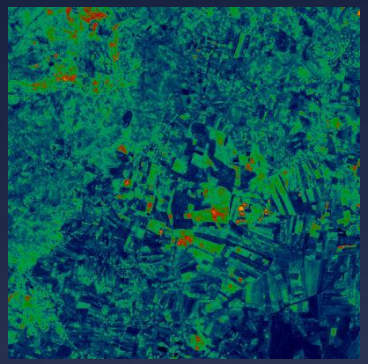


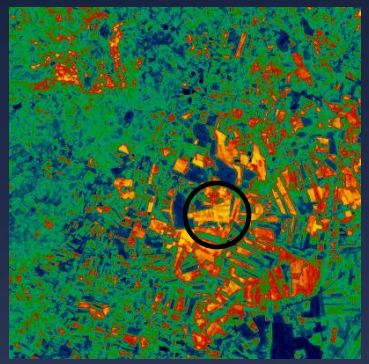
Crop type mapping

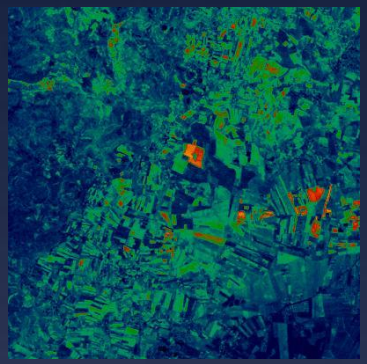
- Exploit the "temporal" signature in satellite data to distinguish crops by their phenological development characteristics
- MODIS-based assessment – enough temporal resolution but too coarse spatially to be applicable in the region
- Landsat-based analysis – sufficient spatial resolution but lacks the temporal dimension (so need to boost this domain)
- Successfully separated spring and summer crops – more difficult to separate two summer crops

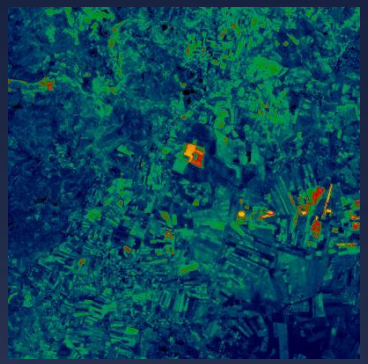
Winter crops (wheat)


January 14, 2010


March 10, 2010

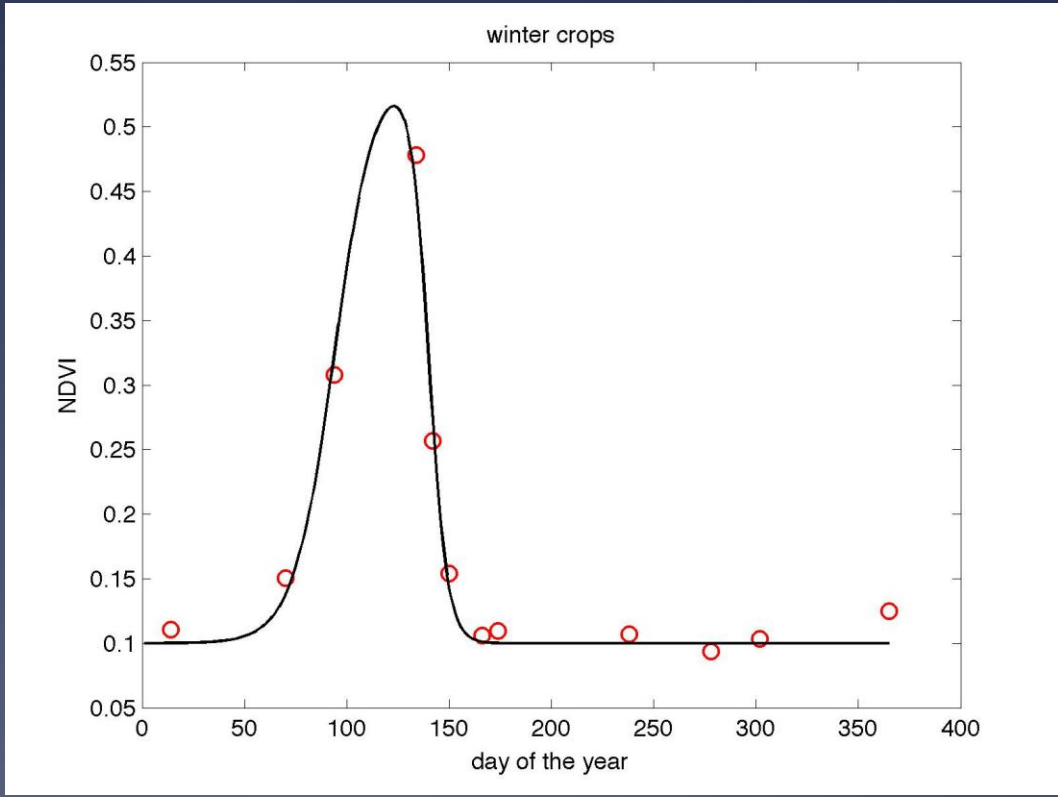

April 3, 2010


May 13, 2010


June 14, 2010

By assembling a time series of vegetation index data, we have the ability to map crop types and their irrigation status

In this case, the winter crops (winter wheat) are visible by their early green-up time period

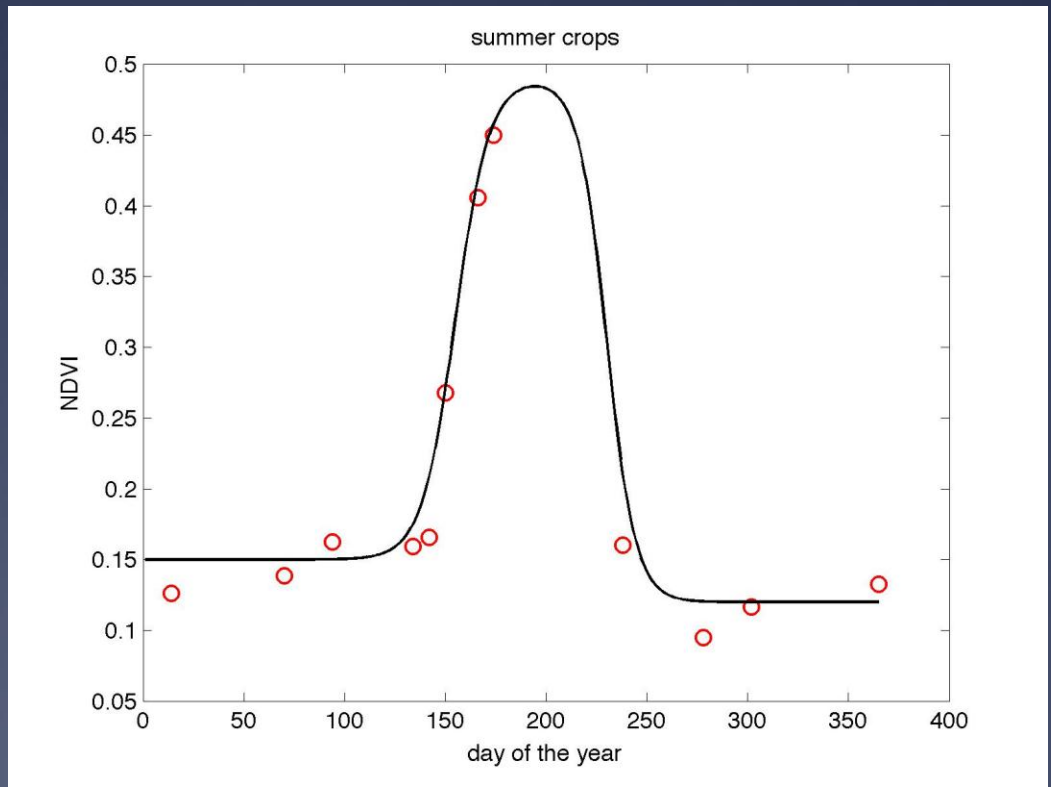


Summer crops (maize)

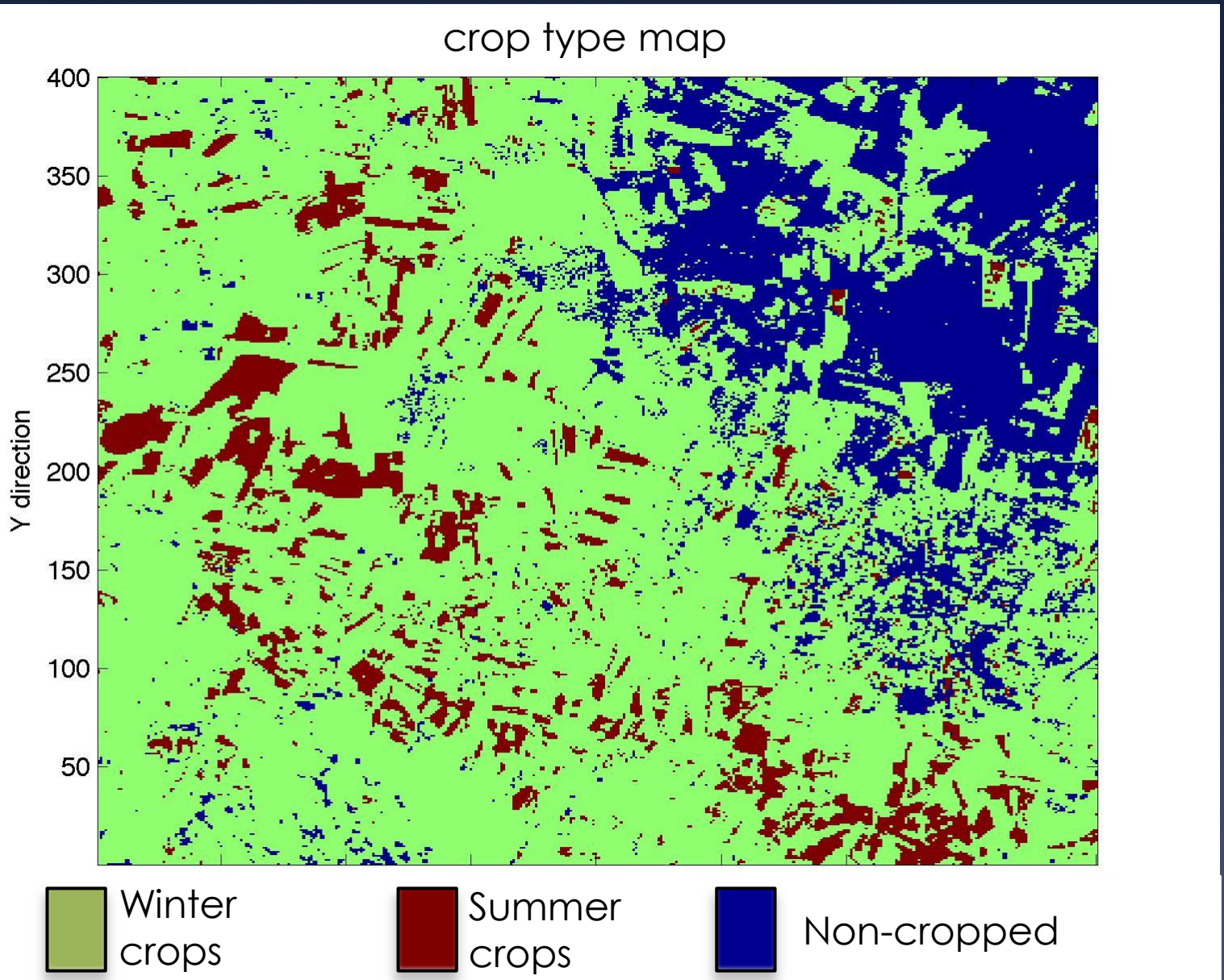
May 13, 2010 June 14, 2010

By assembling a time series of vegetation index data, we have the ability to map crop types and their irrigation status

In this case, the summer crops (maize?) are visible by their late green-up time period



A Jordanian example



Summary

- Regional scale irrigation mapping completed and being used for hydrological modeling/LDAS
- Local scale mapping is in progress but this will require local inputs from the users
- Crop type mapping is country specific – two crops are doable, more crops are work in progress
- Having a crop type map allows crop-specific water loss assessment which is a key input for agricultural water management
- Climate change impacts are less known in the region
- Need regional-scale predictions but more importantly, need sector specific impact assessment.